



Design and Fabrication of Semi-automatic Dishwasher Machine

Bhojraj Padole¹

bhojrajpadole29@gmail.com

Manoj Buche²

manojbuche19@gmail.com

Abhilash Shinde³

asshindeabs@gmail.com

Ankit Khobragade⁴

Mangesh Pagote⁵

Madhav Hiratkar⁶

Prof. Prajakta Pimpalkar⁷

Department of Mechanical
Engineering,
Priyadarshini Bhagwati college
of Engineering, Nagpur, India.

Abstract—This paper discusses how to reduce human efforts in dishwasher. The dishwasher has made cleaning and drying dishes much easier and more efficient. This paper also discusses the problems faced in usage of Automatic Dishwasher and solutions on those problems. Automatic dishwasher uses large amount of energy, time and is costly. And being costly, the usage of automatic dishwasher in our country is very less. By using semi-automatic dishwasher, time as well as human efforts can be significantly reduced. Also by using plastic material for casing part or galvanize iron, the problem occurs like rusting and staining can be easily removed. By separating assembly in single compartment for washing of dishes, rinsing of dishes and washing of glasses, large amount of work can be done in considerably less time. In conventional dish washing process large amount of human power as well as more amount of water is used. Semi-Automatic dish washer is developed to reduce these problems.

Index terms - Motor, steel casing, drain pipe, rack, water jet.

I. INTRODUCTION

Washing dishes is most commonly done activity in the world, in most of families people wash dishes by hand which is straining to muscles and detergent is chemically harmful. As far as manual process is concerned in houses of India, washing is done by hand scrubbing which is straining to the muscles through its energy and postural requirements. It may also lead to clinical, anatomical disorders and back pain which may affect the operator's health. Many of their household chores are performed by the women and some can be very physically challenging and time-consuming. So in several ways in which we can improve their lifestyle, and on aspect that we can improve on is the way they wash their dishes. Currently the chore of washing dishes is performed by the women and can be very labor intensive as it is done for up to several hours each week. The same can be experienced in marriage ceremony with caterers. In today's world of Automation Era it is barely possible to find any field that implemented atomization which reduces Human effort, improves Production rate and also increases Efficiency.

Then it could be the biggest manufacturing industry Pharmaceutical industry, Hospitality field and even Household or Kitchen automation. But still our country is not getting enough benefits from automation and the reason behind this limitation is less Knowledge about automatic products, High device cost, kind nascence feeling about atomized devices. However this fear is not seen in the product which does not involve much Sensors Complex Electronic Circuits, and simple easy User Friendly devices. The very familiar example of Automatic dishwasher. This automatic dishwasher is used on mass scale in foreign countries, however the same is rarely seen in our country.

But disadvantages found in automatic dish washer machine are-

A. Lower spray arm- The spray arm is blocked by small items or food remains, due to that it faces difficulty. So, periodic inspection is necessary.

B. Remnants of detergent stuck inside dispenser- Most of the time compartment of automatic dishwasher is damp when it was filled with detergent, but in actual practice it must be dry before detergent is added.

C. Water remains inside appliance- If blockage or similar types of problems occurs in automatic dishwasher then water gets should *very carefully* check a printed copy.

II. MATERIALS AND METHOD

Washing dishes is not the most rewarding task. Cooking can be creative, but cleaning up afterward seems like a waste of time and leaves the person washing complaining about "dishpan hands." Most conventional dishwashers installed in U. S. households today use 7-14 gallons per load and account for less than 2 percent of the water used in an average American home. Despite the small portion of overall water consumption by dishwashers, newer machines are substantially more water efficient than older models. Today the most efficient (full-size) machines use a maximum of 7 gallons per load – and some as little as 4.5 gallons but by using semi automatic dishwasher we can reduce it up to 2 gallons. Energy savings also result from upgrading to an efficient dishwasher because fewer gallons of water need to clean and as the process is semi automated we can program the cycle according to quantity of dishes. A semi automatic dishwashers feature microprocessor- controlled sensor-assisted wash cycles that adjust the wash duration to the quantity of dirty dishes or

the amount of dirt in the rinse water. This can save water and energy if the user runs at partial load and set the timer according to load.

MATERIALS- galvanized iron sheet, two spray arm, drains cleaner, half HP motor.

Also the specification to fabricate dishwasher machine are as follows-

Motor power = $\frac{1}{2}$ hp

power = $0.5 \times 746 = 0.373$ kW

For bearing:

Serial bearing number	= 0.304 (T 13-21)
Bore inner Diameter	= 25mm
Width	= 20mm
Outer diameter	= 50mm
F _a	= 0.1N
F _r	= 0.2N

III. WORKING PRINCIPLE



Figure 1: Fabricated model of dishwasher semiautomatic machine

The title design and fabrication of dishwasher (semi-automatic) because it involves both the machine work with very less human effort. The design will consist of one rectangular galvanize iron casing compartment. The compartment will contain the dish, cutlery or crockery utensil's for cleaning. This compartment will be filled with the detergent water upto 50% height to avoid splashing. There will be two rotating jet above and below with negligible clearance between dish and jet , a stand will be

fixed at the bottom so that the dishes can rest on it and there will be no need to hold the dishes while they are being washed. Then clean water for rinsing the detergent is spray though the jet fixed at both the sides of the dishes. So that there won't be any possibility of food stains or detergent remnants on the dishes. After this third and last step will comprise again detergent water, at very high speed and at last again a clean water is sprade for final cleaning.

IV. CONCLUSION

The design, construction and evaluation of a dish washing machine were successfully carried out. The capacity of the machine was 24 plates' per 20 minutes. The designed dishwashing machine is very efficient and easy to operate. In order for this comparison to be competent, the result must be statistically significant. This means that a large enough number of participants with different dishwashing skills has to be included and appropriate statistical analysis performed. Dishwashing machines have other negative aspects that have not been considered. One of them is that they use heavy detergents in order to consume less water. On the other hand the detergent used by the Dish master is quite diluted and is biodegradable, with no phosphates, enzymes, or citrus additives. Also, end-of-life of dishwashers is not considered, i.e. problems with their disposing, recycling, permanent waste.

REFERENCES

- [1] Dhale A. D., Ghodke L. S., Hase P. U. , Jarag S. V., Shelar S. S, "Design and development of semi-automatic dishwasher", International Journal of Engineering Research and General Science Volume 3, Issue 3, May-June, 2015.
- [2] Tips for Installing Dishes Dishwasher Product Entries and Comments April 17th, 2014.
- [3] Ringmaster, User Guide And Installation Manual, U110142-03
- [4] Siemens Dishwasher Siemens Pvt. Ltd. <http://www.siemens-home.com/in/productlist>
- [5] Dunn Collin, "Collin Dunn Design", Kitchen Design, www.treehugger.com, Jan 22th, 2009.
- [6] Easy Wash Dish Washer, Mordeal Pvt. Ltd.
- [7] Odesola & Afolabi, Design, "Fabrication and Performance Evaluation of a Domestic Dish Washing Machine", Afrrev Stech: An International Journal of Science and Technology, Bahir Dar, Ethiopia , Vol.1 (1), January-March 2012.